



ASBESTOS

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What Is Asbestos?

Until about 1980, asbestos was widely used in building materials to give strength, increase heat insulation, and provide fire resistance.

Health Effects of Asbestos

When asbestos products get old, they can become crumbly and disperse tiny fibers into the air. If you breathe asbestos particles over time, they can accumulate in your lungs and lead to serious respiratory problems, including asbestosis (a chronic, progressive lung disease caused by prolonged inhalation of asbestos particles), cancer and other lung diseases.

Sources of Asbestos

It was used in roof and siding shingles, floor tiles, soundproofing and fireproofing materials, insulation around pipes, heating ducts and flues, textured ceilings, and decorative finishes.

- steam pipes, boilers, and furnace ducts wrapped for thermal insulation
- resilient floor tiles and sheet flooring (vinyl asbestos)
- cement sheets, millboard, and other materials used to insulate around furnaces, fireplaces and woodstoves
- soundproofing and decorative materials sprayed on walls and ceilings
- textured paints and patching and joint compounds
- roofing and siding shingles (asbestos cement)
- artificial ashes and embers
- consumer products needing insulation (such as ironing board covers and stove top pads)

Detection of Asbestos

Asbestos-containing materials generally cannot be recognized by sight; therefore, identification by special testing is needed.

Reducing Asbestos Problems

If the material is in good condition: **leave it alone!**

Before beginning any remodeling work, have a laboratory test done to confirm or deny the presence of asbestos in suspicious materials. Call your local health department for procedures of obtaining a sample. If materials are damaged or disintegrating:

- Seal or encapsulate - use a sealant to bind materials together, or coat the material so fibers cannot be released
- Cover or enclose - cover the asbestos-containing materials so fibers cannot be released
- Do not cut, tear, sand, saw, drill, or scrape asbestos-containing materials unless absolutely necessary, and then only after taking full safety precautions.

Safety Precautions for Asbestos

Here are some general guidelines for how a trained professional works with asbestos-containing materials. Do not attempt to remove asbestos-containing materials without proper training.

1. Seal off room. Do not let children, pets, or other household members into the area; post a warning sign.
2. Shut down heating or cooling systems. Avoids distribution of fumes, fibers, or dust.
3. Keep dust and fibers in the work area. Use disposable plastic floor and shoe coverings.
4. Wear a respirator and protective gear. Wear disposable protective coverup and gloves.
5. Wet asbestos-containing materials with a solution of water and detergent (about one teaspoon detergent to one quart water). Use a hand sprayer.
6. Avoiding handling, breaking and cutting materials .
7. Dispose of contaminated debris properly. Encase all asbestos-containing debris in two layers of plastic for disposal; follow local requirements for proper disposal.
8. Do not eat or drink in the work area.
9. Thoroughly wet clean the removal area. Vacuum using a special cleaner with a high efficiency particulate air (HEPA) filter and wet clean again.
10. Families with young children or pregnant women should move out of the house during major remodeling if asbestos hazards are present ore being removed.

If removal of asbestos-containing materials is necessary, use a trained and certified professional. For more information, call your local county health department (you can find the phone number in your local phone directory under your county name or the government section), contact the State Department of Health at (801) 538-6101, or contact your local Cooperative Extension Office.

*Sources: Healthy Indoor Air for America's Homes (3rd ed.), Hidden Environmental Hazards for the Home Remodeler Instructional Module; and Home*A*Syst: An Environmental Risk-Assessment Guide for the Home. Funding for this brochure from Healthy Indoor Air for America's Homes: CSREES, EPA, MSU.*

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COMBUSTION POLLUTANTS

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What are Combustion Pollutants?

Combustion pollutants are gases or particles that come from the burning of fuels:

- Natural or LP (liquefied petroleum) gas
- Wood
- Oil
- Kerosene
- Coal

Combustion pollutants are sometimes called combustion by-products because they are produced by the burning of all fossil fuels. Combustion pollutants also come from burning tobacco. Specific combustion pollutants that are of most concern in your home are the following:

- Carbon monoxide - an odorless gas that can kill.
- Nitrogen dioxide - gas that can damage the respiratory tract.
- Sulfur dioxide - gas that irritates the eyes, nose, and respiratory tract.
- Particulates - tiny particles that make up smoke and irritate the eyes, nose, and throat.

Health Effects of Combustion Pollutants

Health effects from exposure to combustion pollutants vary from very mild to lethal. Typical health effects are:

- Headaches
- Dizziness
- Sleepiness
- Nausea
- Irritated eyes
- Breathing difficulties
- Respiratory problems (such as cancer and coughing)

People with allergies, asthma, or chronic respiratory or heart problems are particularly susceptible to health effects from combustion pollutants. It is important to note, though, that these health effects may be caused from other sources besides combustion pollutants.

The combustion pollutant carbon monoxide (CO) is of the greatest concern because it can be fatal. Hundreds of people are killed each year by CO in their homes. Carbon monoxide can build up in an

enclosed space and it is odorless and colorless, so you may not be able to sense what is making you sick. Carbon monoxide reduces the ability of hemoglobin in the blood to carry oxygen. Health effects or symptoms of CO poisoning can be similar to other illnesses, such as the flu or allergies.

Lower doses of CO: Nausea, dizziness, weakness, muscle ache. Higher doses of CO: Impaired judgment, paralysis, coma, death

Sources of Combustion Pollutants

Combustion pollutants in the home come from a variety of sources:

- Heating or cooking appliances that burn fossil fuels:
 - Gas, oil, coal, or wood furnaces or boilers
 - Gas or oil water heaters
 - Gas or kerosene space heaters
 - Fireplaces and wood or coal stoves
 - Gas ranges and ovens
 - Gas clothes dryers
- Tobacco smoking
- Exhaust from automobile engines operating in attached garages
- Other equipment with internal combustion engines, such as lawn mowers or generators
- Other combustion/burning activities, such as welding or soldering
- Gas or charcoal grills and hibachis

A condition known as backdrafting can increase the danger from combustion pollutants. Backdrafting occurs when there is negative pressure in the home, which causes combustion by-products to spill into the room rather than exhaust to the outside. This scenario is most likely to occur in “tight,” well constructed, energy efficient homes that do not have controlled ventilation.

To prevent backdrafting of combustion pollutants in your home:

- Keep all combustion equipment, flues, and chimneys in top working order
- Do not use an exhaust fan in the same area where a naturally-vented combustion appliance is operating
- Select closed combustion or draft-induced combustion equipment, or provide an outside air source for combustion appliances, especially in tightly constructed homes
- Do not implement air-tightening measures, such as caulking, weather stripping, insulation, or new/improved windows, without investigating potential impacts on the operation of combustion equipment

Detection of Combustion Pollutants

Consider the installation of a carbon monoxide alarm with an audible warning. A CO alarm will alert you to dangerous, high levels of carbon monoxide, and give you time to vacate or ventilate the home. Depending on the type of CO alarm, it may not detect low levels of CO that can still make you ill. *A CO alarm does not replace regular maintenance, inspection, and safe operation of combustion equipment!*

Combustion pollutants of indoor air may be the source of health problems when:

- Symptoms occur only in the home

- Symptoms improve when you leave the home
- More than one person in the home has similar symptoms
- Your home has one or more of the following five air quality problems
 - Pollutants from combustion equipment are not exhausted to the outside of the home
 - Combustion equipment is not maintained in good working order
 - Combustion equipment is not regularly inspected for safe operation
 - Air pressure indoors is lower than outdoors, preventing safe exhaustion of combustion pollutants
 - Tobacco smoking is permitted in the home

Every piece of equipment or activity in the home that involves combustion or burning of fossil fuels has the potential to introduce combustion air pollutants.

Reducing Combustion Pollution

First...*Keep all combustion equipment well-maintained and inspected for safety.*

Experts recommend combustion heating systems, such as furnaces and boilers, be inspected by a trained professional *every year* prior to the heating season for the following:

- Blocked or clogged openings to flues and chimneys
- Excessive production of carbon monoxide
- Cracked, separated, or disconnected flue pipes
- Dirty filters (clean or replace monthly)
- Rust or cracks in the heat exchanger
- Soot, corrosion, or creosote buildup
- Burner/flame adjustment
- Exhaust or gas odors

Always operate combustion equipment safely, according to directions, and for its intended purpose. For example, never use an oven or clothes dryer as a space heater, or never use a charcoal grill inside the house. Have combustion equipment installed correctly by a trained installer and according to local safety codes.

Second...*Exhaust all combustion pollutants to the outside of the home.*

- Avoid the use of unvented combustion appliances inside the home, such as kerosene or gas space heaters.
- Do not disconnect vents on combustion appliances, even if it seems like a way to get extra heat in the winter.
- Use an exhaust fan ducted to the outside to provide spot ventilation if a combustion appliance is not vented directly outside; always use an exhaust fan when operating a gas range or oven.
- When purchasing new combustion appliances, look for sealed combustion units that use outside air for combustion and then exhaust it back outside; therefore, combustion pollutants are never mixed with room air.

Third...*Maintain an adequate pressure balance between the home and the outside.*

- Provide an outside air source for combustion equipment
- Consider opening a window slightly when operating an exhaust fan

Fourth...*Do not allow tobacco smoking in your home.*

- Secondhand smoke contains over 4,000 chemicals, 200 of which are known poisons, 40 of which

- could cause cancer
- Secondhand smoke can be an irritant to the body—it can cause other acute and chronic health problems
 - increases irritation of eyes, nose, and throat
 - lung irritation can cause coughing, excess phlegm, chest discomfort, and reduced lung capacity
 - could increase risk factors for heart disease
 - causes serious health problems in children

Source: Healthy Indoor Air for America's Homes (3rd ed.), Combustion Pollutants in the Home Instructional Module and Secondhand Smoke Instructional Module. Funding for this brochure from Healthy Indoor Air for America's Homes: CSREES, EPA, MSU.

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FORMALDEHYDE

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What is Formaldehyde?

Formaldehyde is a chemical that is released into the air as a pungent vapor; many of us remember this smell from the high school biology lab. Formaldehyde is a strong irritant that affects the eyes, nose, throat and skin. It may also cause headaches and fatigue.

Formaldehyde has a number of useful properties. It is a good preservative and makes an excellent adhesive, therefore used in the building and furnishings industries. It is also found in small amounts in some textiles as an anti-wrinkle (permanent-press) agents.

Health Effects of Formaldehyde

Low doses of formaldehyde cause watery eyes or burning sensations in the eyes, nose, and throat. Larger doses can cause nausea, breathing difficulties, headaches, and fatigue. High doses can cause asthma attacks. Some people are highly sensitive to formaldehyde and react to concentrations that would not bother other people. Formaldehyde has been shown to cause cancer in laboratory animals, but to date there is limited evidence that it causes cancer in humans. Nevertheless, it is classified as a “probable human carcinogen” by the EPA and the National Institute for Occupational Safety and Health (NIOSH).

Sources of Formaldehyde

In the past, particle board and medium density fiberboard were major sources of formaldehyde in the environment. However, some particle board is now being manufactured with reduced or no formaldehyde. The culprit is the adhesive urea formaldehyde which can break down and release the gas. A related adhesive, called phenol formaldehyde (used in softwood plywood and oriented-strand board) releases little, if any, formaldehyde. Therefore, products with phenol formaldehyde are widely recommended as substitutes for board products using urea formaldehyde. Oriented-strand board is now widely used for flooring, sheathing and roof decking.

In the mid-1980s, some homes had severe problems due to improperly mixed urea formaldehyde foam insulation (UFFI). This product was taken off the market and is virtually unavailable today. Foams installed back then are unlikely to cause problems today because they continue to off-gas. Other types of foam insulation are not associated with such problems. In fact, there are some very good foams being used that have little or no off-gasing.

Some commercially-applied furniture and floor finishes (acid-cured finishes) can also release formaldehyde. Hardwood plywood, paneling, and interior plywood are sources of formaldehyde as well. Permanent-press fabrics, some other textiles, and cosmetics are sources of trace amounts of formaldehyde. In addition, formaldehyde can be produced by combustion processes where there is a gas flame and cigarette smoke.

Formaldehyde emissions can continue for a long time after the original product is manufactured. The emissions and concentration levels can be increased by elevated temperature and humidity.

Detection of Formaldehyde

Those who are familiar with the characteristic smell of formaldehyde may be able to identify it by its odor. (The formaldehyde symptoms we have mentioned are not much help in identifying this substance since these symptoms are also produced by a wide array of other irritants.)

Environmental testing firms (listed in the yellow pages of the phone directory) should be able to provide testing for residential formaldehyde levels. Since such tests are costly, it is wise to establish a health problem that may be related to formaldehyde or that you are worried about the presence of formaldehyde in your home. The U.S. does not have any standards for formaldehyde in residential indoor air. Generally over time, the level of formaldehyde dissipates. A ventilation organization has proposed a voluntary standard of 0.10 part per which may still cause problems for sensitive individuals. Some agencies recommend lower levels.

Reducing Formaldehyde Problems

Existing homes.

The first step in reducing formaldehyde problems in existing homes is to identify possible sources. As mentioned earlier, likely sources include particle board, fiberboard, acid-cured finished, paneling and hardwood plywood, and cabinets and furnishing made from these materials. Such furnishings are often covered with plastic laminate, veneer, or a “woodgrain” covering.

Formaldehyde gas cannot penetrate into the room. It is blocked by coatings. Although special formaldehyde sealants are available, varnishes such as polyurethane are also effective in this regard (two coat are preferred). Coating should be applied to all exposed edges and surfaces (for example, the underside of countertops, and cabinet interior and drawers) to reduce off-gassing of formaldehyde.

Since high humidity and elevated temperatures increase formaldehyde release, these conditions should be controlled when possible. Also, air conditioning, dehumidifiers, and other moisture control measures should be explored. Additionally, ventilation can help lower indoor formaldehyde levels when outdoor weather conditions permit.

New construction.

In new construction, specify the use of low-emitting or formaldehyde-free materials, sometimes referred to as material with low VOC's— low volatile organic chemicals. Some building products are now being manufactured to have “lower” formaldehyde emission. (These products are identified by a stamp indicating compliance with HUD standards for formaldehyde emissions or labeled low VOC's.) While this is an improvement, there is still no guarantee that indoor formaldehyde levels will be acceptable. Although there have been press reports about research showing certain plants (such as

spider plants) can absorb formaldehyde and other indoor pollutants, other studies show such effects are limited and it would be impractical (or impossible) to have enough plants to counteract continuous formaldehyde emissions (Resource: "An Update on Formaldehyde," CPSC).

Source: Healthy Indoor Air for America's Homes (3rd ed.), Formaldehyde in the Home Instructional Module. Funding for this brochure from Healthy Indoor Air for America's Homes: CSREES, EPA, MSU.

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How to Purchase a Healthy Home

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Buying a home is the American dream. We dream about the colors, size, and location of future homes. We spend hours finding the right one - a place that's convenient and fits our lifestyle. But do we ever stop to consider how healthy a home is that we are purchasing?

What does "healthy home" mean, anyway? And why is it such a big deal? Why is it so important to be aware of the health of your home? YOU will be spending a lot of time there, and so will your family. Being aware of the following indoor air pollutants will help you and your family live in a healthier environment.

Contact your local Health Department for information about how to fix and test for the following problems. You can also contact the Department of Health at (801) 538-6101 or a Utah State University Cooperative Extension service in your community.

Lead

The major sources of lead in the home are lead-based paint, drinking water, and residue from leaded gasoline. When purchasing a home, examine the paint to see if it is chipping, cracking, or flaking. If the home was built before 1978, you may want to test the paint and the water for lead. Lead can have serious health effects, especially for children, including slow mental development and damage to the nervous and reproductive systems.

Tests are available at hardware and building supply stores. If lead-based paint is found in your home, there are several things you can do. If the paint is in good condition, it's not an immediate risk; an easy way to solve the problem is the paint over lead-based paint. Another option is to replace the item or strip the paint if necessary.

Safety Precautions for Lead & Asbestos Removal

1. Do not attempt to remove lead- or asbestos-containing materials without proper training.
2. Seal off room to children, pets, or other household members; post a warning sign.
3. Shut down heating or cooling systems to avoid distribution of fibers or dust.
4. Keep dust and fibers in the work area. Use disposable plastic floor and shoe coverings.
5. Wear a respirator and protective gear. Wear disposable protective coverup and gloves.
6. Wet lead- and asbestos-containing materials. Wet with a solution of water and detergent (about one teaspoon detergent to one quart water) with a hand sprayer to minimize dust.
7. Avoiding handling, breaking and cutting materials.
8. Dispose of contaminated debris properly. Encase all lead- and asbestos-containing debris in two layers of plastic for disposal; follow local

Asbestos

Until about 1980, asbestos was widely used in building materials to give strength, increase heat insulation, and provide fire resistance. When asbestos products get old, they can become crumbly and disperse tiny fibers into the air. These particles can accumulate in the lungs and cause respiratory problems and lung diseases, including asbestosis, cancer of the lungs.

Special testing is needed for the detection of asbestos. If it is found, and it's in good condition, *leave it alone!* If materials are damaged or disintegrating, seal, encapsulate, cover, or enclose them.

Water Pollutants

Public drinking water in the U.S. is safe for most healthy people. However, about 95% of rural residents use private wells to supply drinking water. These wells are designed to provide clean, safe drinking water however, improperly constructed or poorly maintained wells can create a pathway for fertilizers, bacteria, pesticides, viruses, nitrate, lead, copper, and other harmful materials to enter the water supply. The health effects from these contaminants range from diarrhea and upset stomach to kidney or liver damage.

Well water should be tested *every year!* It may be helpful to ask your neighbors what their well water results were—that doesn't mean you don't need to test! To solve contamination problems, you can reduce backflow of contaminated water into the main source, let your water run until it changes temperature to clear out the pipes, use cold water for cooking and drinking, seal unused wells, or treat the water.

Radon

Radon is an odorless, tasteless gas that causes no immediate symptoms or health effects. It occurs from the natural radioactive decay of uranium and radium in the soil. Sources include well water, natural gas, soil, and some building materials. People exposed to radon may have damaged lung tissue and/or lung cancer.

To test for it, buy radon test kits that say "meet EPA requirements." To treat the problem, contact a certified radon contractor. You can also plug leaks in your home or change the home's ventilation patterns.

Formaldehyde

Formaldehyde is a chemical that is released into the air as a pungent vapor; many of us remember this smell from the high school biology lab. In some homes, particle board and medium density fiberboard are by far the major sources of formaldehyde in the environment; permanent-press fabrics and some furniture, carpeting, and floor finishes are other sources. Formaldehyde is a strong irritant that affects the eyes, nose, throat and skin and may also cause headaches, fatigue, or death.

You can detect formaldehyde in your home by smell, with environmental testing firms, or with do-it-yourself test kits. To reduce the problem in existing homes, identify the sources then coat the surfaces, control humidity and temperature, and ventilate the home. To avoid the problem in new construction, select low formaldehyde materials sometimes referred to as low VOC's.

Combustion Products

Combustion pollutants are sometimes called combustion by-products; they are produced by the burning of all fossil fuels and tobacco. Specific combustion pollutants that are of most concern in your home are:

- Carbon monoxide - an odorless gas that can kill
- Nitrogen dioxide - gas that can damage the respiratory tract
- Sulfur dioxide - gas that irritates the eyes, nose, and respiratory tract
- Particulates - tiny particles that make up smoke and irritate the eyes, nose, and throat

Installing a carbon monoxide alarm is one of the easiest ways to detect and protect yourself from this combustion pollutant. If you are experiencing symptoms such as headaches, dizziness, fatigue, sleepiness, nausea, irritated eyes, and/or breathing problems, you may have a combustion pollutant in your home (especially if carbon monoxide symptoms improve when out of the homes). To protect yourself and your family, keep all combustion equipment well-maintained and inspected for safety, exhaust all combustion pollutants outside, and do not allow tobacco smoking in the home.

Moisture & Bugs

Your house is home to many organisms. Some are good, some are not so good. Moisture and bugs (also called biological contaminants) come from living or once-living organisms. They include mainly animal hair, dander, saliva, and feces; molds and other fungi; dust mites; cockroaches and insect residues; pollen; and microscopic organisms. These can cause odors, damage household materials, lead to allergic reactions and asthma attacks, and cause infectious diseases and respiratory problems. Each person has a different sensitivity to these contaminants.

Moisture and bugs can be detected by sight (as with some mold), smell, evidence of rodents and insects, and if any of the following conditions are present: high humidity, standing water or household pets. The most effective way to reduce problems is regular cleaning, disinfecting, and keeping surfaces dry. You can also limit the use of carpeting, upholstered furnishings, and “dust catchers” if dust mites are a problem.

Adapted from *Healthy Indoor Air for America's Homes* (3rd ed.), *Help Yourself to a Healthy Home: Protect Your Children's Health*, and *Home*A*Syst: An Environmental Risk-Assessment Guide for the Home*. Funding for this brochure from Healthy Indoor Air for America's Homes: CSREES, EPA, MSU

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How to Purchase a Healthy Home

Table

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Pollutant	Health Effects	Sources	Detection	Solutions
Lead	Slow mental development, learning & behavioral problems, damage to nervous & reproductive systems, high blood pressure, harm to fetus	Drinking water, lead-based paint, residue from leaded gasoline, folk medicines, dirt	Tests available at hardware & building supply stores, contact local Health Department.	Replace painted item, cover over lead-based paint, use damp mop to control dust, hand wash, let water run 1-2 minutes in the morning before drinking.
Asbestos	Respiratory problems, lung diseases, asbestosis: cancer of lungs	Insulation around pipes, duct wrap, vinyl floor tiles, spackling, roof & siding shingles, floor tiles, soundproofing materials, heating ducts & flues, textured ceilings, decorative finishes	Special testing needed - contact local Health Department.	If in good condition, leave alone! Have laboratory test done to confirm/deny presence - call local Health Department. If materials are damaged or disintegrating: seal or encapsulate, cover or enclose.

Water Contaminants	Upset stomach, diarrhea, “blue baby” syndrome, birth defects, miscarriages, learning & behavior problems, colic, damage to kidneys & liver, cancer	Bacteria, viruses, nitrate, lead.	Have well water tested at laboratory <i>every year</i> ! Ask neighbors about their results. Contact local Health Department.	Reduce backflow, have well inspected every 10-15 years, let water run until temperature changes in lead pipes, seal unused wells, treat water, drill new well, get water from another source.
Radon (uranium, radium)	Damaged lung tissue, lung cancer	Well water, natural gas, some building materials	Test with radon test kits that say “meet EPA requirements.”	Contact certified radon contractor. Plug leaks, change ventilation patterns of home.
Formaldehyde	Irritation of eyes, nose, throat, & skin; nausea; breathing difficulties; headache; fatigue; & asthma attacks	Particle board, some furniture & floor finishes, hardwood plywood & paneling, permanent-press fabrics, cosmetics	Smell, environmental testing firms, do-it-yourself test kits available by mail.	<i>Existing homes:</i> identify sources, coat surfaces, control humidity & temperature, ventilate. <i>New construction:</i> select low formaldehyde materials.
Combustion (carbon monoxide, nitrogen dioxide, sulfur dioxide, tobacco smoke)	Headaches, dizziness, sleepiness, nausea, irritated eyes, breathing & respiratory problems, death	Gas ranges, fuel-fired space heaters, wood-burning stoves, fireplaces, charcoal grills & gasoline engines	Install CO alarm. May have problems if symptoms occur only in home & improve when you leave, more than one person has similar symptoms, and combustion sources are present.	Keep all combustion equipment well-maintained & inspected for safety. Exhaust all combustion pollutants to outside of home. Maintain adequate pressure balance between home & outside. Do not allow tobacco smoking in home.
Biologicals (moisture, bugs, animal dander)	Allergic reactions, asthma attacks, some infectious diseases	Walls, floors, furniture, textiles	Musty smell, evidence of high humidity, standing water, house pets, evidence of rodents & insects.	Clean, disinfect, & dry surfaces. Prevent standing water, regular cleaning, limited use of carpeting & upholstered furnishings.

Information sources: Healthy Indoor Air for America's Homes (3rd ed.), Help Yourself to a Healthy Home: Protect Your Children's Health, and Home*A*Syst: An Environmental Risk-Assessment Guide for the Home. Funding for this matrix from Healthy Indoor Air for America's Homes: CSREES, EPA, MSU.

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HOW TO PURCHASE A HEALTHY HOME

Indoor Air Quality Assessment Checklist

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March 2002

FL/HH-05

Y N

- ☐ ☐ Do you have any unvented combustion appliances?
- ☐ ☐ Do any household members smoke in your house?
- ☐ ☐ Do any furry pets live indoors?
- ☐ ☐ Do you have any house plants?
- ☐ ☐ Do you park your cars in an attached garage?
- ☐ ☐ Do household members do: woodworking, gluing, jewelry or pottery making, painting, soldering, welding, photography, or model building inside the house?
- ☐ ☐ Is part of your living area below ground?
- ☐ ☐ Is your house insulated with asbestos?
- ☐ ☐ Are heating vents corroded or rusted?
- ☐ ☐ Do burner flames on gas heating or cooking appliances appear yellow instead of blue?
- ☐ ☐ Do you have water leakage in your basement?
- ☐ ☐ Are unusual and noticeable odors in your house?
- ☐ ☐ Is the moisture noticeable on windows or other surfaces?
- ☐ ☐ Does the air seem stale?
- ☐ ☐ Are any of the following symptoms noticeable among residents: headaches, itchy or watery eyes, nose or throat infection or dryness, dizziness, nausea, colds, or sinus problems?
- ☐ ☐ Is the house unusually warm or cold?
- ☐ ☐ Is there a noticeable lack of air movement?
- ☐ ☐ Is dust on furniture noticeable?
- ☐ ☐ Is dust or dirt staining walls, ceilings, furniture, or draperies?
- ☐ ☐ Have you weatherized your home recently?
- ☐ ☐ Is any family member less than 4 or more than 60 years old?
- ☐ ☐ Is anyone normally confined to the house more than 12 hours per day?
- ☐ ☐ Does anyone have asthma, bronchitis, allergies, heart problems, or hypersensitivity pneumonitis?
- ☐ ☐ Does anyone in the household often wake up in the morning with a headache?



If you answered “yes” to 10 or more answers, you may have poor indoor air quality. To improve the quality of your home’s air, ask yourself if you can change any of your “yes” answers to “no.”

Following are some additional suggestions:

- ✓ Use a vacuum cleaner with a HEPA filter and clean carpets often.
- ✓ To remove dust, clean hard floors with a damp mop, and wipe window sills with a damp cloth often.

- ✓ Clean up crumbs and spills in the kitchen right away.
- ✓ Check all combustion appliances to make sure they vent to the outdoors. Make sure your gas appliances, furnace and wood burning stove all have yearly checkups.
- ✓ Test your home for radon.
- ✓ Find out if your home has lead based paints or lead in the water. You may need to have your home, soil or water tested.
- ✓ Don't try to remove lead-based paints or asbestos on your own.

Sources: *Your Home's Health: Indoor Air Quality Assessment* and *Help Yourself to a Healthy Home: Protect Your Children's Health*. Funding for this brochure from Healthy Indoor Air for America's Homes: CSREES, EPA, MSU.

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Lead

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What is Lead?

Until recently, paint and water pipes often had a metal in them called lead. Lead was also in gasoline and got into the air and soil from car exhaust. It's not used in these ways anymore, but there is still plenty of lead around. Lead is dangerous because it is so widely used and lasts forever in the environment. It never breaks down into a harmless substance.

Health Effects of Lead

Lead, depending upon the level, can have wide-ranging effects on humans. Lead can poison people by getting into their mouths or lungs from breathing it in from the air. Even very low lead levels in children can slow mental development and cause learning and behavioral problems. Higher levels may cause damage to the nervous system and the reproductive system. Children with too much lead in their bodies may not even look or feel sick. A simple blood test is the only way to know if your child is being exposed to lead. If a pregnant woman gets lead into her body, it can harm the fetus. Lead can also cause high blood pressure in adults. Sadly, the effects of lead poisoning are frequently irreversible.

Sources of Lead

Most problems with lead come from old paint. You are most likely to have lead in your home if you live in an older house or apartment. Lead-based paint that is in good condition is not an immediate problem; it may be a risk in the future, though. You can't always tell if you have a lead problem just by looking at the paint. Lead can be a fine dust from the paint in your house that's created as paint ages or as painted surfaces rub against each other. Lead can also be in dirt tracked inside, in the soil and air around your home or in your drinking water. If lead-based paint is cracking, chipping, flaking, or being rubbed by contact, the danger of lead exposure is much higher than if the paint is perfectly intact.

Although your drinking water is not usually a concentrated lead source like paint or soil, it can still pose risks to your family. Lead can enter your water from several points: lead pipes that bring water to the home, lead pipe connectors, lead-soldered joints in copper plumbing, and lead-containing brass faucets and pump components. In some private wells, underwater pumps with brass fittings can cause elevated lead concentrations in drinking water, especially with new pumps or if the water is soft. Water that is soft or acidic can be corrosive and tends to dissolve lead from pipes and fittings more easily.

Home water softeners may increase the amount of lead leached into your drinking water *only if* lead is present in your water system.

Detection of Lead

Many large hardware or building supply stores have products where you can test for lead. You can also contact the Department of Health for testing supplies. Test paint, soil, and/or water to determine if it contains lead.

If you have, or suspect you have, lead-based paint in your home, it is important to have young children (under 6) tested. Contact your physician or the local Department of Health about testing for blood-lead levels. You can find the phone number of your county health department in your local phone directory under your county name or the government section; or call the Utah Department of Health at (801) 538-6101.

In 1996, federal regulations were instituted requiring property sellers and landlords to disclose known lead hazards in housing built before 1978. Remodelers should be cautioned to keep accurate records of lead testing or remediation. As of June 1999, according to the Federally regulated Lead-Based Pre-Renovation Education (Lead PRE) Rule, remodeling contractors who will be disturbing more than 2 square feet of lead-based paint in pre-1978 housing are required to disclose the risks of lead to their clients.

Reducing Lead Problems

There is no completely safe “Do-It-Yourself” method to remove lead paint.

What can you do about lead-based paint?

- Replace the painted item, especially if it can be easily removed without creating lead dust; for example, install a new door or molding.
- Cover over the lead-based paint, such as with new wall board, plaster, or paneling.
- If it is necessary to strip the lead-based paint (for example, to maintain the historic integrity of molding), try to remove the item from the home for stripping.

Stripping lead-based paint

In the process of stripping lead-based paint, most agree how NOT to do it, few agree how TO do it.

Definitely do not:

- Burn off paint with a torch or high temperature heat gun - releases toxic fumes
- Power sand or dry scrape the paint - releases large amounts of dust
- Chemically strip with methylene chloride -leaves a lead residue (and the stripper is toxic)
- Grit blast - leaves a dust residue

Maybe: depending on precautions and the training of the worker:

- Use a chemical stripper to soften (therefore less likely to be airborne), then scrape. Use a respirator.
- Paint over it

Safety Precautions for Lead

Here are some general guidelines for how a trained professional works with lead-containing materials. Do not attempt to remove lead-containing materials without proper training.

1. Seal off room. Do not let children, pets, or other household members into the area; post a warning sign.
2. Shut down heating or cooling systems. This avoids distribution of fumes, fibers, or dust.
3. Keep dust and fibers in the work area. Use disposable plastic floor and shoe coverings.
4. Wear a respirator and protective gear. Wear disposable protective coverup and gloves.
5. Wet lead-containing materials. Wet lead-containing materials with a solution of water and detergent (about one teaspoon detergent to one quart water) with a hand sprayer to minimize dust when removing loose or flaking lead-based paint.
6. Avoid handling, breaking and cutting materials.
7. Dispose of contaminated debris properly. Encase all lead-containing debris in two layers of plastic for disposal; follow local requirements for proper disposal.
8. Do not eat or drink in the work area.
9. Thoroughly wet clean the removal area. Vacuum using a special cleaner with a high efficiency particulate air (HEPA) filter and wet clean again.
10. Families with young children or pregnant women should move out of the house during major remodeling if lead hazards are present.

Sources: Healthy Indoor Air for America's Homes (3rd ed.), *Hidden Environmental Hazards for the Home Remodeler Instructional Module*; *Help Yourself to a Healthy Home: Protect Your Children's Health*; and *Home*A*Syst: An Environmental Risk-Assessment Guide for the Home*. Funding for this brochure from Healthy Indoor Air for America's Homes: CSREES, EPA, MSU

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MOISTURE & BUGS

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What Are Moisture & Bugs?

Your house is home to many organisms. Some are good, some are not so good. Moisture and bugs (also called biological contaminants) come from living or once-living organisms. They include mainly animal hair, dander, saliva, and feces; molds and other fungi; dust mites; cockroaches and insect residues; pollen; and microscopic organisms. These can cause odors, damage household materials, lead to allergic reactions, and cause infectious diseases and respiratory problems. Each person has a different sensitivity to these contaminants.

Health Effects of Moisture & Bugs

Allergic reactions are the most common health problem associated with biological pollutants. People differ in their sensitivity to biological allergens—some may have no symptoms, while sensitive persons may have severe health problems. Common symptoms include: watery eyes, runny nose and sneezing, nasal congestion, itching, coughing, wheezing, difficulty in breathing, headache, dizziness and fatigue.

The most severe reaction to allergens is an asthma attack, which can be life-threatening. The American Lung Association reports there are nearly 10 million people in the U.S. with asthma. Of these, over 2.5 million are children. There are over 4,000 deaths each year from asthma. The number of persons with asthma has been consistently increasing over the last 15 years. Airborne biological pollutants present a special risk to people with allergies and asthma. Note: these pollutants do not *cause* asthma. Rather, certain pollutants can trigger an attack in people who have asthma.

Infectious diseases caused by bacteria and viruses are generally passed from one person to another person through physical contact. Some bacteria and viruses circulate through indoor ventilation systems.

Sources of Moisture & Bugs

Biological pollutants are found in every home and cannot be eliminated completely. Their growth and quantities can be controlled by keeping surfaces clean and moisture levels low. Many biological contaminants will increase in damp or humid spaces. Good maintenance practices can control moisture and reduce the need for chemical products like pesticides and disinfectants—both of which could add other pollutants to the air.

Detection of Moisture & Bugs

It is not practical for a non-professional to test for the presence of biological contaminants. If contaminants are suspected in the home, an investigation should be conducted to remove and control them because of the health consequences.

MOISTURE

Left unchecked, mold can continue to grow and cause health problems for sensitive people. Because there are no standards for “normal” levels of mold, tests are not usually conducted. When tests are done, however, types and levels of molds in the house are compared with molds in the outside air.

Mold growing on surfaces can occasionally be seen (it is sometimes invisible) or smelled (it has a musty odor). Mold should be suspected wherever there are water stains, standing water, or moist surfaces. Conditions that indicate high humidity levels include: condensation on windows or walls, water pooled in the basement and crawlspace, rotting wood or other signs of water damage, use of humidifiers, or use of unvented kerosene and gas heaters. Damp carpet, walls feeling cold to the touch, and areas where there is poor ventilation (such as closets) may have mold growth. Cooking or bathing without using an exhaust fan and firewood stored in the home can also promote mold growth.

Refrigerator drip pans, humidifiers and dehumidifiers, and the condensate pans in air conditioning units should all be inspected to insure that they are not dirty and are not harboring biological pollutants. The Consumer Product Safety Commission (CPSC) recommends regular cleaning of humidifiers and refilling with clean water. Humidifiers should also be treated with a disinfectant (such as chlorine bleach) regularly—once a week for small humidifiers and every other week for larger ones. This means washing with chlorine bleach and rinsing.

Mold also grows in wall cavities, under carpets, behind wall coverings, above ceilings, and in other places where moisture can accumulate undetected. Before testing for mold, an investigation can be conducted to find building components that are damp or wet.

BUGS

Many of these same conditions for mold also promote the growth of dust mites. Dust mites have no smell and cannot be seen. Bedding and other soft textiles are where dust mites thrive. Whenever pets are in the house, there will be animal dander. Rodents and other insects (such as cockroaches) can also be the source of allergens for sensitive people.

Reducing Moisture & Bugs

MOISTURE

Tips for Controlling Moisture and Mold in the Home

- Clean, disinfect, and dry surfaces
- Prevent standing water, such as in basements or the drip pans of refrigerator and air conditioners.
- Fix leaks and seepage problems immediately.
- Make sure rainwater drains away from your house.
- Use a vapor-proof ground cover (such as 4- to 6-mil plastic) in enclosed crawl spaces.
- Dispose of wet carpeting and other damp fabric furnishings.
- Use fans that exhaust to the outside when bathing, showering, or cooking.

- Vent all combustion appliances to the outside.
- Use dehumidifiers and/or air conditioners to remove excess moisture in warm, humid weather.
- Increase air circulation by opening closet doors and moving furniture away from walls.
- Raise the temperature of cold surfaces with insulation or storm doors.
- Avoid oversized air conditioners.
- Limit the use of humidifiers.
- Limit houseplants (they release moisture into the air and can get mold growth on them).

Keeping surfaces clean and dry is the most effective method of preventing and removing mold. In particular, bathroom surfaces and fixtures should be cleaned to remove soap scum and body oils. Also, running an exhaust fan during and after showering and bathing helps reduce moisture levels.

Other areas of the house should also be kept clean and dry. If carpeting or other furnishings have become wet, they must be dried very quickly and thoroughly to prevent mold growth. Textiles that have been wet for several days often cannot be saved.

Hard surfaces with mold growing on them should be cleaned with a disinfectant, such as chlorine bleach. Use about 1 cup chlorine bleach per gallon of water and dry quickly after cleaning. Textiles should be cleaned in accordance with label directions; chlorine bleach used on textiles will most likely change the color and damage the fibers.

BUGS

Household dust includes some biological contaminants that are common allergens. Animal dander is shed from skin, hair, or feathers. Dust mites are microscopic insects, and their feces—the primary allergen—are easily airborne. Cockroaches and their feces are also allergens. Regular cleaning, including dusting with a treated cloth, damp cleaning, and laundering bedding with hot water, are needed to control these contaminants.

Regular vacuum cleaning may help control dust, but some particles are so small that they pass through cleaner filters and become airborne. Some vacuum cleaners have high-efficiency (HEPA) filters to trap smaller particles.

If dust-related allergies are a particular problem, limit the use of carpeting, upholstered furnishings, and “dust catchers.” Follow recommended procedures for dust control, and keep sleeping areas as allergen-free as possible.

Sources: Healthy Indoor Air for America’s Homes (3rd ed.), *Instructional Module: Bugs, Mold, and Rot (Biologicals)*; and *Home*A*Syst: An Environmental Risk-Assessment Guide for the Home*. Funding for this brochure from Healthy Indoor Air for America’s Homes: CSREES, EPA, MSU.

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RADON

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March 2002

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What is Radon?

Radon is an odorless, tasteless gas that causes no immediate symptoms or health effects. It occurs from the natural radioactive decay of uranium and radium in the soil. The radioactive decay products of radon, charged ions, have a static charge that enables easy attachment to water vapor, dust, and smoke particles in the air. It enters the home through cracks and openings in the concrete that are in contact with the ground—in a basement, for example. It can also enter the house through the water where wells have been in contact with soil containing radon. Radon is measured in units called picoCuries per liter (pCi/L) of air. Annual radon levels above 4 pCi/L are considered excessive and require remediation.

Health Effects of Radon

Radon gas decays into radioactive particles that can get trapped in your lungs when you breathe. As they break down further, these particles release small bursts of energy that can damage lung tissue and can cause lung cancer. Not everyone exposed to elevated levels of radon will develop lung cancer. And the amount of time between exposure and the onset of the disease may be many years. People who smoke and are exposed to radon gas over time have a ten times greater risk of contracting lung cancer.

Your chances of getting lung cancer from radon depend mostly on: 1) how much radon is in your home, 2) the amount of time you spend in your home, and 3) whether you are a smoker or have ever smoked.

Sources of Radon

Radon occurs from the natural radioactive decay of uranium and radium in the soil and comes from various sources. It can come from well water, natural gas, and, in rare cases, some building materials (such as concrete containing radium).

How Does Radon Enter Your Home?

1. There must be uranium in the soil.
2. Pathways for radon to enter indoors must be present (holes, cracks, plumbing, sumps).
3. Air pressure indoors must be lower than in the surrounding soil.

All three conditions must be present to have a radon problem!

If you reduce any one of these conditions, less radon will enter your home. The last two conditions,

determined by the house and its construction, are the key ones for mitigation.

Detection of Radon

Different parts of the country have different levels of radon. If you live in a high-risk area for radon, or if neighbors have found high levels, you should take this potential threat seriously. Because every home is built differently, even neighboring homes can have very different levels. The only way to find out about radon in your home is by testing. Remember, generally the recommended level of radon, in the United States, is below 4 picoCuries per liter (pCi/L) of air.

Look for radon test kits that say “meets EPA requirements.” An inexpensive screening test that lasts four to seven days and costs \$5 to \$15 can give a rough idea of how much radon is present. The test should be conducted when windows and doors are closed and placed in the basement. If a high level of radon is found, a second long-term test (at least three months’ duration) is recommended to give more accurate information about radon in the home. (Note that radon induction into homes is maximum during winter months.)

Reducing Radon Problems

If an unsafe level of radon is verified by the second test, there are a variety of things you can do to reduce radon. These involve either plugging the leaks—such as caulking cracks in basement walls—or changing the ventilation patterns of your home so that radon isn’t drawn inside. Check with your state radon office at the Department of Environmental Quality (DEQ) at (801) 536-4250, Cooperative Extension, local contractors, or health agencies for advice. A trained and certified radon mitigator can be invaluable in helping you reduce radon in your home. Sellers of homes are required by state law to disclose known radon problems.

Help is available, often locally, for mitigating radon. Good information resources include your State Department of Health or your State Radon Contact. You can call the EPA’s toll-free Indoor Air Quality Information Clearinghouse at (800) 438-4318 for a current listing of State Radon Contacts.

EPA also has a national hotline if you suspect your drinking water is a source of radon. The toll-free number is (800) 426-4791. This national service will supply phone numbers and local addresses of state-certified water testing laboratories throughout the country. These labs can advise citizens about testing water and also about local conditions where radon in water may be a concern. However, you should always test the air in your home for radon before testing well water.

Sources: Healthy Indoor Air for America’s Homes (3rd ed.), *Radon in the Home Instructional Module*; and *Home*A*Syst: An Environmental Risk-Assessment Guide for the Home*. Funding for this brochure from Healthy Indoor Air for America’s Homes: CSREES, EPA, MSU

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WATER

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Every day Americans drink more than one billion glasses of water! We also depend on water in our homes to clean, cook, and bathe. If you are like most people, you trust that your water is safe. This is mostly true. Public drinking water in the U.S. is generally safe. However, there are times when your home water supply may not be safe. Using unsafe water to drink or prepare food can make you sick.

If you have a well or other private water supply, it's up to you to keep your drinking water safe. About 95% of rural residents use private wells to supply drinking water. These wells, which tap into local groundwater, are designed to provide clean, safe drinking water. However, improperly constructed or poorly maintained wells can create a pathway for fertilizers, bacteria, pesticides, or other materials to enter the water supply. Once in groundwater, contaminants can flow from your property to a neighbor's well, or from a neighbor's property to *your* well.

Health Effects and Sources of Contaminated Water

What may be in drinking water that is not safe!

Bacteria and Viruses

Bacteria and viruses can cause diseases. Drinking water with these germs may cause upset stomachs, diarrhea, or more serious illnesses. It can be worse for children, pregnant women, and sick or older people. Just one drink of water with these germs can make you sick.

Nitrate

Nitrate gets in to water from animal and human waste, and from fertilizer. Too much nitrate in you drinking water can cause "blue baby" syndrome in infants under 6 months old. Some experts believe nitrate may also result in birth defects and miscarriages. Baby food or formula made with drinking water needs to be safe.

Lead

Lead is a metal that can get into water from your pipes. Too much lead can cause children to have learning and behavior problems and other illnesses.

Other Harmful Chemicals

Other harmful chemicals can get into drinking water. Pesticides may get into your water supply by

washing off lawns and fields or leaking from storage containers. Gas or oil can seep into the ground and get into drinking water. Even very small amounts of some chemicals can cause health problems when found in the water, such as damage to kidneys, liver or other organs. Some cause cancer and others can cause problems if you are pregnant.

Children may have more problems than adults because of their immune systems, their bodies are still developing, and for their size, they drink more liquid than adults.

Detection of Contaminated Water

If your water comes from a private well, you cannot see, smell, or taste most problems so you need to have your water tested at a laboratory at least *every year*. Well water should at least be tested for bacteria and nitrate. You may want to have your water tested for other pollutants, like pesticides, if you have had problems in the past. A good source of information on well water quality may be your neighbors. Ask them what their tests have revealed. A more complete water analysis for a private well will tell you about its hardness; corrosivity; and iron, sodium, and chloride content. Call your county health department to find out how to have your water tested; you can find the phone number in your local phone directory under your county name or in the government section. Or call the State Department of Health at (801) 538-6101 to find the number of your county health department. You can also call EPA's Safe Drinking Water Hotline toll-free at (800) 426-4791.

Reducing Contaminated Water Problems

Contaminants often have no odor or color and therefore are hard to detect. Contaminants can put your health at risk, and it is difficult and expensive to remove them. Once your water becomes contaminated, the only options may be to treat your water after pumping, drill a new well, or get your water from another source.

One problem that can be fixed is backflow. Backflow of contaminated water into your water supply can occur if your system undergoes sudden pressure loss, if the well fails or, backflow can also occur if you are on a public water system, if there is a line break in the system. The simplest way to guard against backflow is to leave an air gap between the water supply line and any reservoir of "dirty" water. For example, if you are filling a swimming pool with a hose, make sure that you leave an air gap between the hose and the water in the pool. Toilets and washing machines have built-in air gaps.

Where an air gap cannot be maintained, a backflow prevention device such as a check valve or vacuum breaker should be installed on the water supply line. For example, if you are using a pesticide sprayer that attaches directly to a hose, a check valve should be installed on the faucet to which the hose is connected. Inexpensive backflow prevention devices can be purchased from plumbing suppliers.

Also, remember that well water equipment doesn't last forever. Every ten to fifteen years, your well will require inspection by a qualified well driller or pump installer. You should keep well construction details, as well as the dates and results of maintenance visits for the well and pump. It is important to keep good records so you and future owners can follow a good maintenance schedule.

If you have lead pipes there are several things you can do to reduce water contamination. When you haven't used your water for a while (like when you wake up in the morning or get home from work), you need to clear out the pipes by letting the cold water run until you feel the temperature change

especially if you are going to drink the water. Also, never use hot water from the tap for cooking or drinking because the heat helps dissolve the metals faster; use cold water and warm it on the stove.

If you have an unused well on your property, ask the local health department how to seal it. Unused wells that have not been properly filled and capped can let pollution into groundwater and make your drinking water unsafe.

Sources: *Help Yourself to a Healthy Home: Protect Your Children's Health and Home***A*Syst: An Environmental Risk-Assessment Guide for the Home*. Funding for this brochure from Healthy Indoor Air for America's Homes: CSREES, EPA, MSU.

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